

# 行政院國家科學委員會專題研究計畫 期末報告

## 勞依茲辛迪卡評等的決定因子：中央基金的影響

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中華民國 103 年 01 月 13 日

中文摘要：勞依茲保險市場是世界重要的保險市場之一。與各國家之安定基金不同，勞依茲保險市場設有所謂的中央基金，而辛迪卡所發行的所有保單，皆受到該基金的全額保證。本研究的目的是在於：找出影響勞依茲保險人接受評等機率及所得到評等之決定因子。我們發現：大型、獲利能力較好與流動性較高的辛迪卡，較容易被評等，也會得到比較高的評等；對再保險較為依賴的辛迪卡，也會較容易被評等，但會得到比較低的評等。我們的發現，較為支持「訊號假說」，而比較不支持「不確定性減少假說」。

中文關鍵詞：中央基金、辛迪卡、評等

英文摘要：The Lloyd' s market plays a pivotal role in the global insurance business. Unlike the national guaranty funds operating within the insurance markets, a Central Fund was set up by the Lloyd' s market to provide a full guarantee for all policies issued by the syndicates, and since unsolicited ratings are also assigned to the syndicates by Standard & Poor' s (S&P), a combination of these institutional attributes make the London insurance market an appropriate setting for our analysis of whether the 'signaling' hypothesis or the 'uncertainty reduction' theory holds. Based upon a sample of Lloyd' s syndicates covering the years 2006 to 2010, we examine the determinants of (i) the likelihood of being rated, and (ii) the rating that is likely to be assigned by S&P, from which we document evidence of selectivity bias. Larger, more profitable and liquid syndicates are found to be more likely to receive a rating, and indeed, to have higher ratings. Syndicates with more reinsurance dependence are more likely to be rated, but less likely to obtain a higher rating. Our findings indicate that the 'signaling' hypothesis dominates the 'uncertainty reduction' theory.

英文關鍵詞：Lloyd' s Central Fund； Syndicates； Unsolicited ratings

行政院國家科學委員會補助專題研究計畫  成果報告  
 期中進度報告

勞依茲辛迪卡評等的決定因子：中央基金的影響

計畫類別： 個別型計畫  整合型計畫

計畫編號：NSC 101-2410-H-004-072

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共同主持人：

計畫參與人員：蕭景元、徐健翔、吳雅岩

成果報告類型(依經費核定清單規定繳交)： 精簡報告  完整報告

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出席國際學術會議心得報告及發表之論文各一份(另附)

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涉及專利或其他智慧財產權， 一年  二年後可公開查詢

執行單位：政治大學風險管理與保險學系

中華民國 103 年 1 月 13 日

## 1. INTRODUCTION

Financial economists have been striving for some considerable time to identify the factors motivating firms to solicit ratings and the basis upon which such ratings are actually determined. Although numerous studies have examined the rationale for soliciting corporate ratings, along with the determinants of such ratings, relatively little research has been undertaken into the motivation for firms within the insurance industry to obtain unsolicited ratings, or indeed, the factors affecting these ratings. The primary aim of the present study is therefore to examine the factors potentially determining Lloyd's syndicates' unsolicited ratings.

The Lloyd's market comprises of a number of syndicates playing a pivotal role within the global insurance business; thus, in any analysis of syndicate ratings, it is necessary, and indeed, important to take the distinct features of the Lloyd's market into consideration. For example, despite the fact that syndicates underwrite risk on a respective basis, their capital is mutualized at market level through the Lloyd's Central Fund; it should, however, be noted that in contrast to the guaranty funds operating within the insurance markets across the world, this fund actually serves as a comprehensive warranty for all policies issued by the syndicates.

Although an understanding of the reasons why corporations seek ratings is relatively

well-advanced, there appear to be very few studies which have set out to delve into the motivation for insurers to obtain such ratings.<sup>1</sup> There are two main issues which have been raised in these studies; the first relates to the identification of the factors affecting the initial decisions by insurers to seek ratings by the various agencies, whilst the second examines the determinants of the financial strength ratings which will ultimately be applied to such insurers.

To the best of our knowledge, no study has yet set out to examine the determinants of Lloyd's syndicate ratings; thus, in the present study, we aim to fill the current gap within the literature by investigating the relationship between syndicate ratings and key syndicate-specific characteristics, whilst also seeking to determine whether these characteristics may potentially influence the likelihood of a syndicate being rated. Of particular importance is the fact that, as far as we can determine, this study is the first to examine these two issues within the context of unsolicited ratings and full guarantee funds. We therefore suggest that our results could provide a useful comparison with the prior US- and UK-based studies in which examinations were undertaken of insurer attributes and their association with the financial strength of insurers in policyholder markets with incomplete protection.

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<sup>1</sup> Examples include Pottier and Sommer (1999), Adams, Burton and Hardwick (2003) and Gaver and Pottier (2005).

As noted in a very recent study (Rymaszewski, Schmeiser and Wagner, 2012) self-supporting insurance guarantee funds internalize the costs of insurer insolvency and also reduce potential agency problems. The Central Fund of the Lloyd's market is, in essence, similar to the guaranty funds within the national insurance markets; however, the primary difference between the two types of funds is that the Central Fund provides full protection for policyholders, whereas the guaranty funds do not.<sup>2</sup> Thus, our primary aim in this study is to determine whether the Central Fund of the Lloyd's market directly affects syndicate rating decisions.

Using data on Lloyd's syndicates covering the years 2006 to 2010, our analysis begins with the application of binary and ordered probit regressions as the means of examining the determinants of the likelihood of being assigned a Lloyd's Syndicate Assessment (LSA) by Standard & Poor's (S&P), as well as the determinants of the level of the assessment assigned. Our study is heavily reliant on the related literature on the determinants of insurer ratings, as well as the ratings criteria used by S&P to identify the potential determining factors.

We find that firm size, profitability, liquidity and reinsurance are important factors

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<sup>2</sup>Within the US insurance markets, state guaranty funds provide protection for policyholders in the event of their insurer failing to fulfill their obligations; however, such protection is limited. For example, most states provide maximum life insurance benefits of US\$300,000 and health insurance benefits of US\$100,000. Comprehensive descriptions of the US life and non-life guaranty funds are provided by Brewer, Mondschean and Strahan (1997) and Feldhaus and Kazenski (1998).

determining not only the likelihood of syndicates being rated, but also the level of such ratings. Our results provide general support for the ‘signaling’ hypothesis since they imply that even though policyholder claims are fully guaranteed, financially-sound syndicates may still choose to send a signal to the market by placing additional information into the public domain for potential use by S&P for rating purposes; this suggests that syndicates wish to clearly demonstrate their financial soundness to other stakeholders (creditors, investors and regulators). We also document evidence of a sample selection problem in syndicate ratings.

Several of the prior ratings-based studies have examined the determinants of bond/credit ratings relating to: (i) insurers (Pottier and Sommer, 1999; Adams, Burton and Hardwick, 2003; Gaver and Pottier, 2005); (ii) banks (Moon and Stotsky, 1993; Poon, Firth and Fung, 1999; Poon and Firth, 2005; Poon, Lee and Gup, 2009); and (iii) non-financial firms (Poon, 2003; Han, Moore, Shin and Yi, 2012). These studies invariably set out to examine the determinants of such ratings in the context of whether policyholders or debtholders who place considerable reliance on insuring firms are sufficiently compensated if and when a claim arises.<sup>3</sup>

We extend the prior works by examining whether any significant differences are discernible between the characteristics of those syndicates that are assigned unsolicited

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<sup>3</sup>Policyholders in insurance firms are like debtholders in ordinary firms.

ratings and those that are not assigned such ratings. Of particular significance is the fact that this issue is examined within the context of policyholders with no credit risk in order to determine whether this would affect syndicates' passively receiving unsolicited ratings. We consider that the important institutional attribute, the full guarantee provided by the Lloyd's Central Fund, makes the London insurance market an appropriate environment within which to carry out our research.

One study with a close connection to ours is that of Adams et al. (2003), although there are two major differences between the two studies.<sup>4</sup> Firstly, Adams et al. (2003) used data on UK life, non-life and composite insurers, whereas we use data on the Lloyd's syndicates of the London insurance market. Furthermore, their sample comprised of only 10 percent of all UK insurers authorized to engage in insurance business during their 1993-1997 analysis period; in contrast, our sample represents approximately 83 percent of the total population of syndicates operating within the Lloyd's market during the years 2006 to 2010.

Secondly, we find that the syndicate features which are of particular importance in determining the assigned rating level are also of importance in determining the probability of a rating being assigned when the ratings are unsolicited; these features include firm size, profitability, liquidity and reinsurance dependence. In contrast, Adams et al. (2003) found

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<sup>4</sup>Adams et al. (2003: 542) noted that Standard & Poor's assigned ratings to UK insurers based almost exclusively on public information. Our research uses LSAs assigned to UK syndicates by Standard & Poor's which are also based primarily on public information. This similarity makes the comparison between their study and ours more valid.



that size, liquidity, surplus growth, reinsurance and business activity were important determinants of the probability of being assigned an S&P rating, whilst profitability, liquidity and financial leverage were found to be key factors in determining insurer credit ratings.

The remainder of this paper is organized as follows. Background information on the Lloyd's market is provided in Section 2, followed in Section 3 by a review of the related literature and the definition of our testable predictions, along with a discussion of the methodology and empirical framework employed in this study. A description of our research design and empirical analysis is provided in Section 4, followed in Section 5 by the presentation of our empirical results. Finally, the conclusions drawn from this study are presented in Section 6.

## 2. INSTITUTIONAL BACKGROUND

Lloyd's is a leading market for reinsurance and specialist property, casualty, marine and aviation insurance and is well known as an insurance/reinsurance provider for risks that are characteristically of huge size, complex and often unusual nature, as well as the difficulty involved in actuarially pricing the risk involved. According to the Lloyd's market annual report, gross income from premiums in 2010 had risen to £22,592 million (Society of Lloyd's, 2011).

Lloyd's underwrites a diversified portfolio of businesses by various classes, comprising of reinsurance (37 per cent), property (22 per cent), casualty (20 per cent), marine (7 per cent), energy (6 per cent), motor (5 per cent) and aviation (3 per cent). This portfolio is also diverse from a geographic perspective, with Canada and the US being Lloyd's most important markets, accounting for 43 per cent of its gross income from premiums in 2010; clearly, however, the UK is also an important market, accounting for a further 20 per cent of its gross income from premiums.

Lloyd's has additional business interests in Europe (16 per cent), Central Asia and the Asia Pacific (10 per cent), 'other Americas' (7 per cent) and the rest of the world (4 per cent). Such diversification of the portfolio, from both geographical and business class perspectives, is extremely effective in spreading Lloyd's overall business risk and protecting its financial performance and solvency against individual adverse business and geographical developments.

There are two unique features of the Lloyd's market which distinguish it from all other insurance markets. Firstly, members (both individuals and corporations) provide capital, joining together as syndicates to underwrite the risks involved;<sup>5</sup> all members are financially independent of each other and have no liability for the losses of other members. Secondly,

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<sup>5</sup> Prior to 1994, the capital backing for syndicates was derived mainly from individual members, with unlimited liability, also known as 'Names'; however, according to the Society of Lloyd's (2008), from January 2008 onwards, almost 95 per cent of its market capital was supplied by corporate members with only limited liability.

Lloyd's has a unique capital structure chain comprising of three security links, each of which are described below.

The first two links in the Lloyd's chain are the syndicate level assets and the funds provided by its members, whilst the third link includes the Central Fund and the subordinated debts/securities issued by the Society of Lloyd's. All risk is underwritten by the syndicates on a respective basis, although the policies issued from the 1993 account year onwards are all comprehensively backed by the Lloyd's Central Fund to which members are required to contribute annually based upon their capacity. The risks insured or reinsured by the syndicates are then partly mutualized at market level through the Central Fund.

During our 2006-2010 analysis period, the LSAs assigned by S&P were primarily based on publicly-available syndicate information. Since such ratings are not solicited by syndicates, they are only assigned if sufficient information is available. Under a situation of no policyholder default risk and unsolicited ratings, the full guarantee provided by the Lloyd's Central Fund makes the Lloyd's market an appropriate setting to test whether the 'signaling' hypothesis or the 'uncertainty reduction' theory holds. Additionally, since data on a single industry is used in this study, we are able to control for cross-industry differences in both the regulatory environment and the underwriting/investment/reporting practices used.

In November 2001, the UK insurance regulator, the Financial Services Authority (FSA), assumed legal supervisory responsibility for the Society of Lloyd's and its managing agents, with Lloyd's daily business activities subsequently being overseen by the Corporation of Lloyd's with responsibility for monitoring the performance of the syndicates and managing all regulatory reporting to the FSA. In compliance with the Insurance Accounts Directive Regulations (Lloyd's Syndicate and Aggregate Accounts) 2004, on 1 January 2005, Lloyd's switched its financial reporting from a three-year funded accounting basis to annual UK 'Generally Accepted Accounting Principles' (GAAP), thereby ensuring that the financial information on the syndicates was comparable to that of insurers and reinsurers. This regulatory change also results in our research being comparable to the prior studies on insurers and reinsurers.

### 3. RELATED THEORIES AND HYPOTHESIS DEVELOPMENT

Analysis of the determinants of credit/financial strength ratings is already well documented within the literature, with the related studies being broadly classified into two categories. The first of these involves the identification of the determinants for seeking a rating. The main research issue examined under this category relates to the factors affecting the likelihood of a rating being assigned, with this category being further divided into two sub-categories, solicited and unsolicited ratings.

The major difference between solicited and unsolicited ratings is that the former is requested and therefore paid for by the rated firm, whilst the latter is neither initiated nor paid for by the rated firm. Solicited ratings are assigned based upon private/inside/confidential information, as well as publicly-available company information; they are also assigned on an interactive basis, which would indicate that in most cases, discussion with the company management is a prerequisite. Conversely, unsolicited ratings are primarily assigned based upon publicly-available financial information (such as financial statements and news) with no involvement by the rated company in the overall rating process.

The second strand of the research into the rating determinants examines those factors affecting rating levels. In contrast to various other studies (such as Gaver and Pottier, 2005; and Gray, Mirkovic and Rangunathan, 2006), some of the prior studies simultaneously examined the factors affecting the decision on whether to voluntarily apply for a rating, along with the factors affecting the rating level.<sup>6</sup> Furthermore, most of these studies tend to adopt a similar set of statistically significant variables for their rating likelihood and rating level models; and indeed, some of the firm characteristics that are important in determining the rating likelihood are also found to be important in determining the rating level.

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<sup>6</sup> Examples include Moon and Stotsky (1993), Pottier and Sommer (1999) and Adams et al. (2003).

There are two main theories within the extant literature on the determinants of ratings; that is, the ‘signaling’ hypothesis and the ‘uncertainty reduction’ theory. According to the ‘signaling’ hypothesis, if managing agents expect to receive a good rating outcome they will be motivated to release sufficient financial information on the syndicate to passively obtain a rating in order to signal to the market that their firm is in good financial health.<sup>7</sup> Since firms with superior performance are more likely to be rated, and to obtain a higher rating (Han et al., 2012), this argument is actually based on a process of self-selection.

Those syndicates which perceive that being assigned a rating will be beneficial to them will choose to place sufficient information in the public domain, based upon which S&P can subsequently assign a rating. The reason for choosing to make such information available is that they expect the costs (such as preparing information for public use) to be far exceeded by the benefits (such as more business from customers or a lower cost of capital from capital providers).

Conversely, for various reasons, syndicates may decide not to release sufficient information for rating purposes. Some low-quality syndicates may believe that their financial/operating performance is not good enough to obtain a rating of any benefit to them; thus, they would elect to maintain their non-rated status. Another reason that may

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<sup>7</sup>These two theories are derived mainly from information asymmetry. In the context of insurance, the information asymmetry arises from the complex and technical nature of insurance business.

potentially prevent syndicates from seeking a rating through the release of information is that they may not wish their competitors to learn of their business strategies based upon an assessment of their financial/operating profile. Furthermore, some non-rated syndicates will choose not to seek a rating simply because they do not recognize any need to do so; that is, they may feel that they already have sufficient lucrative business and/or do not need any additional capital.

However, some syndicates can still find themselves being rated, despite the fact that they do not actually want to be rated. In most cases, syndicates will, and can, select for themselves what is better for them; that is, they will make the conscious decision on whether to be rated or remain unrated. Therefore, in an ex-post sense, we expect to find that non-rated syndicates are no less risky than rated syndicates.

The ‘uncertainty reduction’ theory nevertheless suggests that syndicates obtain ratings as a means of reducing the ex-ante uncertainty amongst policyholders, investors and regulators with regard to their future insolvency risk. Based upon this supposition, riskier syndicates are more likely to be rated in order to reassure such policyholders, investors and regulators that they are, in fact, in good financial health. Thus, from an ex-post standpoint, we should find that non-rated syndicates are actually less risky than rated syndicates. We would also expect to find that riskier syndicates will have a lower rating value.

Rating agencies fear that they may make mistakes when assigning ratings; that is, there is the constant danger of underrating or overrating a firm. When setting out to assign ratings to syndicates (which are generally more opaque than banks and insurers), it is believed that rating agencies would tend to be relatively conservative, with conservative rating agencies tending to underrate firms, as opposed to overrating them, for two specific reasons.

Firstly, the adverse consequences associated with overrating are greater than those associated with underrating. The worst case scenario for overrating is a high rating being assigned to a syndicate based upon a low risk evaluation, with the syndicate ultimately becoming insolvent. By contrast, underrating involves a low rating being assigned to a syndicate which is assessed as high risk, when in fact, no default occurs. Clearly, overrating would tend to damage the reputation of the agency far more than underrating.

Secondly, if a conservative rating is assigned to a syndicate, this could also be regarded by the rated firms as a form of ‘blackmail’; that is, if the rated firms consider that the rating which they are likely to be given will be too low, then they may elect to place more information into the public domain in order to obtain a rating which will correctly reflect their financial strength.

Based upon the above discussion, the ‘signaling’ hypothesis suggests that there is a strong likelihood of firms with superior performance applying for a rating; however, the



‘uncertainty reduction’ theory posits that riskier firms are also likely to apply for a rating, although this assumption may not hold in the case of syndicates. Given the existence of the Lloyd’s Central Fund, syndicates will naturally be less motivated to release additional information to obtain an S&P rating, essentially because the managing agents have no need to signal to their policyholders that their syndicate is financially strong, or indeed, to reduce any ex-ante uncertainty amongst policyholders with regard to the future insolvency risk of their syndicate.

We therefore expect to find that no significant differences will be discernible between the variables of the rated and non-rated syndicates discussed below; it is, however, likely that the managing agents will still wish to reduce uncertainty amongst other market participants, such as investors and regulators, or to send a signal to them. If this is the case, then we would expect to find significant differences in certain financial features between rated and non-rated syndicates.

Many potential explanatory factors on the LSAs assigned to syndicates are taken into consideration in this study, where we not only draw on the prior studies examining the financial strength/solvency ratings and bond/credit ratings of insurers, but also review the financial constructs which are considered by S&P when assigning such LSAs. Most of the explanatory variables that are examined in this study are the financial variables that are

stated by S&P as being employed in the determination of LSAs (Standard & Poor's, 2006).

The proxies for these variables used in the present study are described in the following sub-sections.

### **3.1 Firm Size**

As compared to their smaller counterparts, larger firms generally have economies of scale and/or scope along with several other associated benefits, including a greater capacity for dealing with adverse market fluctuations and the ability to raise external funds at lower costs (Harrington and Niehaus, 2004). Since larger firms are generally associated with lower insolvency risk, they will also tend to be assigned higher ratings (Pottier and Sommer, 1999; Gaver and Pottier, 2005).

Furthermore, under the 'voluntary disclosure' theory, as a result of their greater economies of scale in information production, as well as the greater demand for information by market participants, firms are generally motivated to provide more company information (Lang and Lundholm, 1993; Frankel, McNichols and Wilson, 1995). We therefore expect to find that larger syndicates will be more likely to seek an appropriate rating by placing sufficient information into the public domain, as a result of which they are likely to be assigned a higher rating. To mitigate the effects of extreme observations and associated heteroskedasticity on the empirical results, the *FirmSize* proxy is defined in this study as the

natural logarithm of total assets.

### **3.2 Leverage**

Excessive leverage increases insolvency risk (Staking and Babbel, 1995; Cole and McCullough, 2006); thus, highly-leveraged syndicates are generally expected to be more likely to become insolvent, and hence, to receive a low financial strength rating. Based upon the ‘signaling’ hypothesis, such syndicates are unlikely to voluntarily release financial information in order to apply for a financial strength rating; however, under the ‘uncertainty reduction’ theory, highly-leveraged syndicates have a propensity for seeking ratings in order to reduce the ex-ante uncertainty with regard to the insolvency risk arising from their high leverage.

Although Pottier and Sommer (1999) found mixed evidence on the effects of leverage on decisions to seek ratings from AM Best and Moody’s, they documented a negative relationship between leverage and the ratings assigned by AM Best and Standard & Poor’s. Furthermore, Adams et al. (2003) found that both the probability of being rated and the rating level were negatively related to an insurer’s leverage, thereby providing support for the ‘signaling’ hypothesis. Gaver and Pottier (2005) also documented a negative relationship between leverage and rating levels.

Based upon the above discussion, we expect to find that the *Leverage* variable will

have a negative correlation with the rating level; this variable is measured in the present study as the ratio of accumulated reserves to total assets.

### **3.3 Profitability**

The relationship between profitability and rating levels appears self-evident, since a profitable syndicate has a greater likelihood of remaining in lucrative business and a relatively lower likelihood of becoming insolvent. Based upon the ‘signaling’ hypothesis, a more profitable syndicate will be motivated to send out a signal to the market. Thus it will be more likely to voluntarily release its financial information, and accordingly, be assigned a rating; however, under the ‘uncertainty reduction’ theory, we would expect to find that a more profitable syndicate will have a lower association with uncertainty, and thus, will be less likely to obtain a rating.

Nevertheless, the prior empirical research clearly indicates a positive relationship between profitability and both the likelihood of being rated and the rating level assigned (Pottier and Sommer, 1999; Adams et al., 2003; Gaver and Pottier, 2005). We would therefore expect to find the profitability of a syndicate having positive correlations with both the probability of being rated and the level of such rating. The *Profitability* variable is proxied in this study by the return on assets, measured as the ratio of pre-tax profits (including unrealized gains/losses) to total assets.

### **3.4 Liquidity**

Syndicates with higher liquidity levels are expected to be more able to cope with unexpected huge losses, and thus, have a lower likelihood of insolvency. Based upon the ‘signaling’ hypothesis, a highly liquid syndicate is more likely to be rated, and to obtain a higher rating; however, under the ‘uncertainty reduction’ theory, since a more liquid syndicate has less uncertainty, it will be less likely to obtain a rating.

Adams et al. (2003) found that although insurers with higher liquidity had a greater likelihood of being AM Best-rated, they were less likely to be S&P-rated; nevertheless, they found a consistent correlation between insurers with higher liquidity and higher AM Best and S&P ratings, with this positive relationship between liquidity and ratings also being documented by Gaver and Pottier (2005). We expect to find that syndicates with higher liquidity will have a greater likelihood both of being rated and obtaining a higher rating. The *Liquidity* variable is proxied in this study by the ratio of the sum of cash, bonds and stocks to total assets.

### **3.5 Reinsurance Dependence**

Reinsurance involves the transfer of risk from a cedant to a reinsurer. On the one hand, reinsurance serves as an effective substitute for capital in reducing the probability of a cedant incurring the costs of financial distress or bankruptcy (Garven and Lamm-Tennant,

2003). On the other hand, however, there are costs involved in reinsurance, with excessive reinsurance dependence potentially reducing profitability; indeed, Shiu (2004) demonstrated that over the long term, reinsurance will tend to lead to a reduction in profitability.

Furthermore, heavily reinsured syndicates are highly exposed to the insolvency risk of their reinsurer, although the empirical results on this issue are mixed. Pottier and Sommer (1999) documented a positive relationship between the decision to seek a rating and reinsurance dependence, whereas Adams et al. (2003) found a negative relationship; thus, the net effect of reinsurance on rating levels is unclear. The *Reinsurance Dependence* variable is measured in this study as the ratio of reinsurance premiums ceded to direct business written, plus reinsurance premiums assumed.

### **3.6 Business Mix**

Many syndicates specialize in particular lines of insurance business, which can obviously have potential influences on their investment portfolios. We therefore expect to find that the business mix of a syndicate will have significant impacts on the likelihood of the syndicate being rated, as well as the level of the rating assigned. The *Business Mix* variable is measured in this study as the proportions of net earned premiums written on each of the following lines: accident and health, marine aviation and transport, property, liability, reinsurance, motor

damage and miscellaneous.<sup>8</sup>

### **3.7 Business Concentration**

The concentration of a syndicate's lines of business reflects its underwriting profile; those with greater diversity in their underwriting portfolios have a lower degree of risk exposure to the underperformance and volatility of specific sectors (Standard & Poor's, 2006). Pottier and Sommer (1999) argued that business concentration has a negative influence on the probability of being rated, whilst Harrington and Niehaus (2004) suggested that insurers could reduce their underwriting risk by means of diversification of their production lines.

Consequently, we expect to find that the higher the business concentration of a syndicate, the lower the probability of the syndicate seeking a rating, and the lower the rating that is likely to be assigned. We use the Herfindahl index as the proxy for the business concentration of a syndicate, with the *Business Concentration* variable in this study being computed as the sum of the squares of the ratio of individual line-of-business premiums written to gross premiums written.

### **3.8 Capitalization**

Those firms with sufficient capital are expected to have a relatively lower risk of insolvency, and thus, a greater likelihood of being rated and being assigned a higher rating. Within the

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<sup>8</sup>We arbitrarily remove one line of business, 'accident and health', in order to avoid singularity in the regressions. The selection of the omitted line is not found to have any impact on the results.

Lloyd's market, the solvency of a syndicate is backed by the balances of the syndicate members and their funds at Lloyd's. The balances of the syndicate members are the difference between its assets and liabilities, whilst their funds at Lloyd's comprise of the capital provided by members, which is equivalent to the insurers' capital.<sup>9</sup>

The *Capitalization* variable is measured in this study as the ratio of the members' balances plus their funds at Lloyd's to net premiums written. *Ceteris paribus*, the higher a syndicate's capitalization the lower its level of dependence on the Lloyd's Central Fund, and thus, the higher its probability of seeking a rating. We predict that a syndicate with greater capitalization will receive a higher rating.

## 4. RESEARCH DESIGN

### 4.1 Data

The syndicate data set used in the present study includes all of the LSAs assigned by Standard & Poor's between the years 2006 and 2010, with this period having been specifically selected essentially because the S&P ratings assigned during these years were primarily based upon public information, thereby ensuring a representative study sample.<sup>10</sup>

Each of the syndicates was assigned an LSA, ranging from 1 to 5, depending on their

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<sup>9</sup>Since syndicates do not retain profits, there are no policyholder surpluses shown in their balance sheets.

<sup>10</sup>AM Best, Fitch and Moody's also issue Lloyd's syndicate ratings; however, in the majority of cases, these rating agencies either use input from the syndicate's management or provide interactive rating services. The ratings issued by Standard & Poor's are primarily based on information already in the public domain.



business continuity and dependence on the Lloyd's infrastructure and Central Fund (Standard & Poor's, 2007).

Those syndicates that were assigned an LSA of 1 were highly dependent on Lloyd's and had a low likelihood of continuing in business, whereas those that were assigned an LSA of 5 had very low dependence on Lloyd's and a high probability of business continuity. It is, however, worth noting that from the perspective of policyholders, the measure of the financial strength of a syndicate is its financial strength rating on the Lloyd's market, which is essentially based upon the full protection provided by the Central Fund. The LSA distribution of Lloyd's syndicates from 2006 to 2010 is shown in Table 1.

<Table 1 is inserted about here>

Of the total of 325 syndicate-year observations, 127 (39 per cent) were not rated, 87 (27 per cent) were assigned an LSA of 3, 77 (24 per cent) were assigned an LSA below 3 (LSA= 1 or 2) and 34 (10 per cent) were assigned a rating above 3 (LSA= 4 or 5). The distribution of the rated syndicate-year observations appears to have positive skewness, which would thereby imply that in general, Lloyd's syndicates are highly dependent on the Central Fund. This evidence is consistent with the view that unsolicited ratings are invariably found to be conservative.<sup>11</sup>

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<sup>11</sup> See for example Poon (2003), Poon and Firth (2005), Behr and Güttler (2008), Poon, Lee and Gulp (2009), Banner, Behr and Güttler (2010) and Van Roy (2012). Two arguments are proposed in these studies to explain the downward bias in unsolicited ratings. According to the 'self-selection' argument, those firms with better

A possible interpretation of this is that the LSAs assigned by S&P are based mainly on public information, and where there is any doubt, the rating agencies tend to be cautious and conservative. In addition, unsolicited ratings are considered to be less accurate than solicited ratings because the rating agencies have insufficient access to undisclosed information (Baker and Mansi, 2002; Van Roy, 2012).

All syndicates in existence during this period were included in the sample in order to avoid potential ‘survivorship bias’, whilst observations with non-logical values (such as non-positive values for assets, liabilities, members’ balances or premiums) were excluded for those years in which the non-logical values were present. The resultant sample yielded an unbalanced panel of 325 syndicate-year observations. Since this sample of the Lloyd’s market represents roughly 83 per cent of the total population of syndicates, including non-rated syndicates, operating over the period under analysis, it would seem to be sufficiently representative.<sup>12</sup>

## **4.2 Models**

We begin by regressing the likelihood of being rated on the syndicate characteristics, with the model being estimated using a binary probit regression. The dependent variable for this

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performance are more likely to opt for a rating; conversely, since low-quality firms generally do not solicit ratings, they consequently receive no rating or are assigned unsolicited ratings. Under the ‘agency conservatism’ hypothesis, the rating agencies are inclined to assign conservative ratings to firms with lower transparency.

<sup>12</sup>The total numbers of syndicates in the Lloyd’s market were 66 in 2006, 72 in 2007, 81 in 2008, 85 in 2009 and 87 in 2010 (source: website of Society of Lloyd’s, <http://www.lloyds.com>).

regression is a dichotomous variable which takes a value of 1 or 0, depending on whether the syndicate is assigned an LSA. We then use an ordered probit regression to estimate the rating level model.<sup>13</sup> Since the LSAs have an ordinal scale, ranging from 1 to 5, an ordinary linear regression would clearly be inappropriate (Liao, 1994). The ordered probit regression model is as follows:

$$\begin{aligned}
y_{i,t}^* &= x_{i,t}'\beta + \varepsilon_{it} \\
y_{i,t} &= 0 \text{ if } y_{i,t}^* \leq 0 \\
&= 1 \text{ if } 0 < y_{i,t}^* \leq \mu_1 \\
&= 2 \text{ if } \mu_1 < y_{i,t}^* \leq \mu_2 \\
&= 3 \text{ if } \mu_2 < y_{i,t}^* \leq \mu_3 \\
&= 4 \text{ if } \mu_3 < y_{i,t}^*
\end{aligned} \tag{1}$$

where  $y_{i,t}^*$  is a continuous and unobserved variable for syndicate  $i$  in year  $t$ ;  $x_{i,t}$  is a vector of explanatory variables for syndicate  $i$  in year  $t$ ; and  $\beta$  is a vector of the coefficients to be estimated. We assume that  $\varepsilon_{i,t}$  follows normal distribution with zero mean across all observations;  $y_{i,t}$  ranges from 0 to 4 to represent the S&P LSAs (ranging from 1 to 5) for syndicate  $i$  in year  $t$ ; and  $\mu$  refers to the unknown threshold parameters separating the adjacent categories to be estimated.

## 5. EMPIRICAL RESULTS

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<sup>13</sup>Following Poon, Firth and Fung (1999), we also estimate the model using an ordered logit regression, and find that the determinants identified are identical to those using an ordered probit regression. The main theoretical difference between ordered probit and logit regressions is the assumption of the error terms. In a probit model, the error terms are assumed to follow a standard normal distribution, whereas in a logit model they are assumed to follow a logistic distribution. See Liao (1994: 37-47), Borooah (2002: 4-44) and Greene (2008: 831) for comprehensive details on ordered probit and logit regressions.

## 5.1 Univariate Analysis

The summary statistics on the explanatory variables for both rated and non-rated syndicates are shown in Table 2, which also reports the results on the independent samples *t*-tests and Mann-Whitney *U* tests (also known as the Wilcoxon Rank Sum test) for differences in the samples. About half of the explanatory variables are found to be statistically significant at conventional levels, thereby indicating differences in these attributes between rated and non-rated syndicates.

<Table 2 is inserted about here>

A correlation coefficient matrix on all of the explanatory variables included in the regression models is illustrated in Table 3, which shows that the absolute correlation coefficient values between the pairs of variables are generally found to be modest (highest absolute value=0.47). We also calculate the variance inflation factor (VIF) for each explanatory variable to test for possible multicollinearity; however, all of the calculated VIF values are less than 10, thereby suggesting that multicollinearity is unlikely to be a serious concern in this study (Gujarati, 1995).

<Table 3 is inserted about here>

## 5.2 Multivariate Analysis

Table 4 reports the results of the binary probit analysis on the effects of syndicate-specific

characteristics on the rating likelihood of the syndicates. When the constant term is the only explanatory variable (denoted as  $L_0$ ) the log likelihood function value is -217.4546, whereas when all of the explanatory variables are included (denoted as  $L_1$ ) the value is -184.7226; McFadden's (1974) pseudo- $R^2$ , defined as  $1 - \frac{L_1}{L_0}$ , is 0.1505.<sup>14</sup> Furthermore, the Chi-squared statistic, defined as  $2(L_1 - L_0)$ , rejects the null hypothesis that the explanatory power of the model is no greater than a null model without explanatory variables ( $\chi^2 = 65.4638$ ,  $p$ -value = 0.0000).

<Table 4 is inserted about here>

Consistent with our expectations, *Size* is found to be positive and significant at the 5 per cent level, thereby providing support for the argument that larger syndicates have a greater likelihood of being assigned a rating. This is consistent with the 'voluntary disclosure' theory, insofar as firms are generally motivated to provide company information essentially as a result of their greater economies of scale in information production, as well as the greater demand for information by market participants (Lang and Lundholm, 1993; Frankel, McNichols and Wilson, 1995). However, this finding stands in stark contrast to that of Adams et al. (2003), who reported that larger insurers were less likely to be S&P rated.

In line with Pottier and Sommer (1999) and Adams et al. (2003), *Profitability* is found

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<sup>14</sup>The pseudo- $R^2$  value, bounded from below (by 0) and above (by 1), has no natural interpretation; however, Greene (2008) suggested that the value increases with improvement in the model fit.

to be positive and significant at the 5per cent level, indicating that more profitable syndicates have a greater likelihood of being rated. This is consistent with the ‘signaling’ hypothesis, which postulates that profitable syndicates tend to be rated. The estimated coefficient on *Liquidity* is positive (with statistical significance at the 5per cent level), a finding which is consistent with the view that syndicates with higher levels of liquidity have a greater likelihood of being rated.

The *Marine Aviation and Transport* variable is also found to be negative and significant at the 5 per cent level, thereby indicating that syndicates insuring greater levels of risk in the marine, aviation and transportation sector are less likely to be rated. This provides some support for the view that the type of risk speciality in a particular syndicate influences the likelihood of a rating being assigned.

Consistent with the results presented above on the equality tests for rated and non-rated syndicates, the binary probit regression analysis also reveals some differences between rated and non-rated syndicates with regard to the variables included in the model. This indicates potential evidence of selectivity bias in our syndicate data;<sup>15</sup> indeed, we cannot rule out the possibility that smaller syndicates with inferior financial performance may choose not to

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<sup>15</sup> Evidence on selectivity bias varies in the extant literature. Some studies (Poon, 2003; Poon and Firth, 2005) report significant sample selection bias, whilst others find no such evidence. For example, Cantor and Packer (1997) documented very limited evidence of selectivity bias, whilst Pottier and Sommer (1999) identified selectivity bias only in AM Best ratings, but not in S&P or Moody’s ratings; Adams et al. (2003) similarly reported selectivity bias in AM Best ratings, but not in S&P ratings.

release sufficient information, with the result that they are not assessed by S&P.

Some studies stress the potential importance of controlling for any selectivity bias that may be present (Poon, 2003; Poon and Firth, 2005); we therefore use the two-step estimation method of Heckman (1979) to address the potential problem of sample selection bias.<sup>16</sup> We first obtain the inverse Mills ratio from the above binary probit analysis and then use this ratio as an additional regressor in the two-step ordered probit regression model, with the results being reported in Table 5.<sup>17</sup>

As shown in Panel A of Table 5, the inverse Mills ratio is found to be significant at the 5 per cent level, thereby indicating the presence of selectivity bias, and also justifying the use of the Heckman (1979) two-step estimation approach to produce consistent estimates. Furthermore, there are three positive and highly significant estimates of cut-off points, which also indicates that the five categories in the response are indeed ordered (Liao, 1994).<sup>18</sup> The Chi-squared goodness-of-fit test is highly significant at the 1 per cent level ( $\chi^2 = 125.4726$ ,  $p$ -value = 0.0000), which suggests that the fitted model is better than a null model without explanatory variables. The ‘hit ratio’ (the proportion of correct predictions)

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<sup>16</sup> See Cantor and Packer (1997), Poon (2003) and Poon and Firth (2005).

<sup>17</sup> The inefficiency of the two-step method reported by Johnston and DiNardo (1997) is worthy of note. Furthermore, Heckman (1990) had earlier argued that simple estimation techniques may well just be as robust as complicated sample-selection-correction models. We therefore also run the ordered probit regressions without the use of the two-step approach and find that the results remain qualitatively unchanged.

<sup>18</sup> Although we have five levels of LSA, there are only three non-zero estimates of cut-off points, essentially because the first threshold parameter is typically normalized to zero so that there is one less parameter to be estimated (see Equation (1)).

is 58.33 per cent.

<Table 5 is inserted about here>

As expected, *Size* is found to have positive and statistically significant effects on the rating assigned, thereby supporting the view that larger syndicates have higher LSAs. This is consistent with the ‘scale and scope economies’ hypothesis and provides support for the view that larger syndicates have relatively lower insolvency risk. These findings are also in line with Pottier and Sommer (1999) and Gaver and Pottier (2005) who noted that insurer size was positively related to their financial strength rating.

Consistent with our expectations, *Profitability* is found to be positive (with statistical significance at the 1 per cent level), thereby providing strong support for the notion that increased profitability is associated with higher LSAs. This is consistent with several of the prior studies which reported that an increase in insurer rating was found to correspond with higher profitability.<sup>19</sup> *Liquidity* is found to be positive and significant at the 5 per cent level, which thereby suggests that an increase in liquidity is likely to lead to a higher rating. This evidence is again consistent with the findings of Adams et al. (2003).

*Reinsurance Dependence* is found to negative (with statistical significance at the 1 per cent level), which suggests that those syndicates that are heavily dependent on reinsurance

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<sup>19</sup> See Pottier and Sommer (1999), Adams et al. (2003) and Gaver and Pottier (2005).



tend to have lower ratings. This is consistent with the finding of Shiu (2004) that over the long term, reinsurance tends to be associated with a reduction in profitability; however, our evidence conflicts with Pottier and Sommer (1999). We also find evidence of *Business Mix* having some influence on rating levels.

The results on the marginal effects, which are shown in Panel B of Table 5, are generally consistent with the parameter estimate results presented above. We find that an increase in *Size*, *Profitability* and *Liquidity* increases (reduces) the probability of being assigned an LSA of 2, 3 or 4 (LSA of 0 or 1). We also find that an increase in *Reinsurance Dependence* reduces (increases) the probability of being assigned an LSA of 2, 3 or 4 (LSA of 0 or 1).

## 6. CONCLUSIONS

We set out in this study to test two competing rating-related arguments, the ‘signaling’ hypothesis and the ‘uncertainty reduction’ theory, using data on a sample of Lloyd’s syndicates. In the context of unsolicited ratings, the ‘signaling’ hypothesis argues that better-performing syndicates which expect to receive a superior rating outcome are motivated to release sufficient financial information to passively obtain a rating whilst signaling to the markets that the syndicate is financially strong.

However, the ‘uncertainty reduction’ theory suggests that syndicates obtain ratings

simply as a means of reducing ex-ante uncertainty amongst stakeholders with regard to the future insolvency risk of the syndicate. Based upon this theory, riskier syndicates are more likely to seek a rating as a means of reassuring their stakeholders that they are in good financial health. In this study, we attempt to identify those factors that are of importance in determining both the likelihood and the level of ratings, using the Heckman (1979) two-step estimation method in order to avoid any potential selection bias.

We present evidence to show that the factors determining the likelihood of being rated can also explain variations in the LSAs that are assigned to syndicates by Standard & Poor's. In more specific terms, we find larger, more profitable and more liquid syndicates are not only more likely to be rated, but also more likely to obtain a higher rating. However, we find that syndicates with more reinsurance dependence are more likely to be rated, but less likely to obtain a higher rating. Our results provide general support for the 'signaling' hypothesis.

Since all policies issued by syndicates from the 1993 accounting year onwards are fully guaranteed by the Lloyd's Central Fund, some stakeholders (insured parties and policyholders in particular) have no real concerns over the possible future insolvency of the syndicates. Thus, the syndicates have no real need to reduce any ex-ante uncertainty that may be associated with insolvency by obtaining ratings, which may explain why the 'uncertainty

reduction' theory is not supported by our results. However, despite the establishment of Lloyd's Central Fund, syndicates still wish to signal to the market that they are in good financial health. Since S&P LSAs are based on financial information already in the public domain, syndicates seeking a rating will release sufficient additional public information to be assigned a rating.

The results of this study add to the extant literature on the determinants of ratings; in specific terms, we show that despite their ratings being assigned based primarily upon public information and despite the fact that the claims of their policyholders are fully protected, syndicates still feel the need to send out a signal to the market. Finally, we provide evidence of selectivity bias, even in the context of Lloyd's syndicates, thereby providing additional support for the importance of controlling for selection bias when examining the determinants of ratings.

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*Table 1 LSA distribution of Lloyd's syndicates*

Year	N/A*	LSA					Total
		1	2	3	4	5	
2006	19	7	11	21	5	0	63
2007	26	3	14	18	6	0	67
2008	29	4	12	15	7	0	67
2009	26	3	10	18	8	1	66
2010	27	4	9	15	6	1	62
Total	127	21	56	87	32	2	325

*Note:*\*N/A indicates the number of non-rated syndicates.

Table 2 Descriptive statistics and equality tests for rated and non-rated syndicates<sup>a</sup>

Variables	Rated Syndicates		Non-rated Syndicates		Total Syndicates		Mean Difference Tests <sup>b</sup>	
	Mean	S.E	Mean	S.E	Mean	S.E	<i>t</i> -statistic	<i>z</i> -statistic
<i>Size</i>	18.7799	1.1592	17.5620	2.1261	18.3295	1.6895	6.5370***	-4.9933***
<i>Leverage</i>	1.2261	39.5161	-4.2587	31.1917	-0.9172	36.5375	1.3219	-3.8269***
<i>Profitability</i>	0.0700	0.0983	-0.0320	0.3554	0.0301	0.2397	3.8226***	-4.1390***
<i>Liquidity</i>	0.6878	0.1443	0.6139	0.2436	0.6590	0.1925	3.4338***	-1.3538
<i>Reinsurance Dependence</i>	0.1879	0.0941	0.0933	0.7194	0.1511	0.4561	1.8195*	-0.1739
<i>Marine Aviation and Transport</i>	0.1052	0.1650	0.1147	0.1705	0.1089	0.1670	-0.4915	-0.5219
<i>Property</i>	0.1959	0.1764	0.1238	0.2170	0.1678	0.1961	3.2465***	-3.4912***
<i>Liability</i>	0.1827	0.2642	0.1871	0.3428	0.1844	0.2968	-0.1294	-0.7773
<i>Reinsurance</i>	0.3246	0.2677	0.4267	0.4741	0.3644	0.3651	-2.4522**	-1.4739
<i>Motor Damage</i>	0.0603	0.1991	0.0411	0.1718	0.0528	0.1888	0.8867	-4.9832***
<i>Miscellaneous</i>	0.0941	0.2365	0.0738	0.2143	0.0862	0.2280	0.7728	-1.7799*
<i>Business Concentration</i>	0.5022	0.2508	0.7565	1.1248	0.6014	0.7380	-3.0360***	-2.4988**
<i>Capitalization</i>	0.1486	0.3213	3.9183	29.1411	1.6258	18.2920	-1.8032*	-2.1028**

Notes:

<sup>a</sup> We carry out independent samples *t* tests and Mann-Whitney *U* tests (also known as the Wilcoxon Rank Sum test) for all of the explanatory variables included in the models in order to determine whether there are any discernible differences in the means between rated and non-rated syndicates.

<sup>b</sup> The *t*-statistics report the results of the independent samples *t* tests, whilst the *z*-statistics report the results of the Mann-Whitney *U* test. \* indicates statistical significance at the 10% level; \*\*indicates statistical significance at the 5% level; and \*\*\* indicates statistical significance at the 1% level.

Table 3 Correlation coefficient matrix

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
(B)	0.35***												
(C)	0.07	0.07											
(D)	0.21***	0.21***	0.07										
(E)	0.19***	0.13**	0.08	0.23***									
(F)	0.10*	0.09	-0.01	-0.05	0.08								
(G)	-0.03	0.21***	0.06	0.10*	0.04	0.10*							
(H)	0.18***	0.34***	0.06	0.14**	-0.07	0.12**	0.02						
(I)	-0.01	-0.11*	0.04	0.04	0.16***	0.08	-0.11*	-0.19***					
(J)	-0.14**	-0.02	0.01	-0.02	-0.15***	-0.20***	-0.21***	-0.29***	-0.47***				
(K)	0.05	0.05	-0.11*	-0.24***	0.18***	-0.04	-0.16***	-0.12**	-0.15***	-0.04			
(L)	0.04	-0.30***	-0.05	-0.01	-0.03	0.04	-0.14**	-0.16***	-0.18***	-0.29***	-0.04		
(M)	-0.17***	-0.46***	-0.00	0.00	0.02	-0.09*	-0.17***	-0.49***	0.16***	0.05	0.26***	0.04	
(N)	-0.10*	-0.24***	0.01	0.03	0.05	0.16***	-0.05	-0.12**	-0.21***	-0.01	0.26***	-0.03	0.23***

Notes:

<sup>a</sup> The table reports the Pearson correlation coefficients between the variables used in this study, which are denoted as: Rating (A); Size (B); Leverage (C); Profitability (D); Liquidity (E); Reinsurance Dependence (F); Marine Aviation and Transport (G); Property (H); Liability (I); Reinsurance (J); Motor Damage (K); Miscellaneous (L); Business Concentration (M); and Capitalization (N).

<sup>b</sup> \* indicates statistical significance at the 10% level; \*\* indicates statistical significance at the 5% level; and \*\*\* indicates statistical significance at the 1% level.

Table 4 Binary probit regression results<sup>a</sup>

Variables	Expected Sign	Coefficient <sup>b</sup>	Standard Error
<i>Constant</i>		-0.5164	0.4116
<i>Size</i>	+	0.0022 **	0.0010
<i>Leverage</i>	+/-	0.0041	0.0026
<i>Profitability</i>	+	1.4515 **	0.6066
<i>Liquidity</i>	+	1.2181 **	0.4764
<i>Reinsurance Dependence</i>	+/-	0.0023 **	0.0009
<i>Marine Aviation and Transport</i>	+/-	-0.8649 **	0.3712
<i>Property</i>	+/-	0.5792	0.3946
<i>Liability</i>	+/-	0.0083	0.2731
<i>Reinsurance</i>	+/-	-0.1211	0.2477
<i>Motor Damage</i>	+/-	0.5394	0.4156
<i>Miscellaneous</i>	+/-	0.3583	0.3217
<i>Business Concentration</i>	-	-0.5000	0.3273
<i>Capitalization</i>	+	-0.0017	0.0011
Log Likelihood Function		-184.7226	
Restricted Log Likelihood Function		-217.4546	
McFadden's Pseudo-R <sup>2</sup>		0.1505	
Chi-squared Statistic(p-value)		65.4638(0.0000000)***	

Notes:

<sup>a</sup> Year dummies are included within the regression, but the results are not reported here.

<sup>b</sup> \*\* indicates statistical significance at the 5% level; and \*\*\* indicate statistical significance at the 10% level.

Table 5 Two-step ordered probit regression results

Variables	Parameter Estimates			Marginal Effects				
	Expected Sign	Coeff. <sup>b</sup>	S.E.	Prob(Y=0)	Prob(Y=1)	Prob(Y=2)	Prob(Y=3)	Prob(Y=4)
<i>Constant</i>		-23.1131 ***	4.6415					
<i>Size</i>	+	0.8805 ***	0.1080	-0.0705	-0.2572	0.2026	0.1235	0.0016
<i>Leverage</i>	-	0.0104	0.0078	-0.0008	-0.0030	0.0024	0.0015	0.0000
<i>Profitability</i>	+	11.7339 ***	3.0077	-0.9389	-3.4279	2.7002	1.6453	0.0212
<i>Liquidity</i>	+	5.8812 **	2.4894	-0.4706	-1.7181	1.3534	0.8247	0.0106
<i>Reinsurance Dependence</i>	+/-	-0.8785 ***	0.1089	0.0703	0.2566	-0.2022	-0.1232	-0.0016
<i>Marine Aviation and Transport</i>	+/-	-3.1965 *	1.7696	0.2558	0.9338	-0.7356	-0.4482	-0.0058
<i>Property</i>	+/-	1.4951	1.1223	-0.1196	-0.4368	0.3441	0.2096	0.0027
<i>Liability</i>	+/-	-0.0499	0.3335	0.0040	0.0146	-0.0115	-0.0070	-0.0001
<i>Reinsurance</i>	+/-	-0.5052	0.3359	0.0404	0.1476	-0.1163	-0.0708	-0.0009
<i>Motor Damage</i>	+/-	1.4094	1.1304	-0.1128	-0.4117	0.3243	0.1976	0.0025
<i>Miscellaneous</i>	+/-	2.7752 ***	0.8503	-0.2221	-0.8107	0.6386	0.3891	0.0050
<i>Business Concentration</i>	-	-1.9362	1.1898	0.1549	0.5656	-0.4456	-0.2715	-0.0035
<i>Capitalization</i>	+	-0.0023	0.0019	0.0002	0.0007	-0.0005	-0.0003	0.0000
<i>Inverse Mills Ratio</i>	+/-	7.5330 **	3.6046	-0.6028	-2.2006	1.7335	1.0563	0.0136
Index Threshold	$\mu_1$	1.4196 ***	0.1235					
Parameters	$\mu_2$	3.2298 ***	0.1556					
	$\mu_3$	5.0777 ***	0.3452					
Log Likelihood Function		-194.1620						
Restricted Log Likelihood Function		-256.8984						
Chi-squared Statistic(p-value)		125.4726 (0.0000)***						
Hit Ratio		0.5833						

Notes:

<sup>a</sup> The estimation results are reported for the two-step ordered Probit model with sample selection. Year dummies are included within the regression, but the results are not reported here.

<sup>b</sup> \* indicates statistical significance at the 10% level; \*\* indicates statistical significance at the 5% level; and \*\*\* indicates statistical significance at the 1% level.

## **SELF-EVALUATION**

This project was satisfactorily conducted from 1 August 2012 to 31 October 2013. I have written a paper based on the results obtained and submitted it to a journal for publication consideration.

## 國科會補助專題研究計畫出席國際學術會議心得報告

日期：103 年 1 月 13 日

計畫編號	NSC 101-2410-H-004-072		
計畫名稱	勞依茲辛迪卡評等的決定因子：中央基金的影響		
出國人員 姓名	許永明	服務機構 及職稱	政治大學風險管理與保險 學系教授
會議時間	101 年 8 月 5 日 至 101 年 8 月 8 日	會議地點	美國明尼蘇達州 Minneapolis
會議名稱	(中文) 美國風險與保險學會 2012 年會 (英文) American Risk and Insurance Association 2012 Annual Meeting		
發表題目	(中文) 企業社會責任提供像保險一樣的效果嗎？ (英文) Does Corporate Social Responsibility Provide Insuranc-like Effects?		

## 一、參加會議經過

On 5 August 2012 I started my journey from Taipei and arrived at Minneapolis, Minnesota USA on the same day. The purpose of this journey is to attend American Risk and Insurance Association 2012 Annual Meeting. This meeting began from 5 to 8 August, 2012.

The conference was held at the Depot Renaissance Minneapolis Hotel. The first day of the conference started with a welcome reception at Great Hall. From the second day to the last day of the conference, there were six concurrent sessions in total.

I presented my paper entitled “Does Corporate Social Responsibility Provide Insurance-like effects?” on 7 August. My paper is scheduled under the session of “Enterprise Risk Management”, chaired by Professor David Pooser. We had three papers in this session and each paper had a discussant. My discussant is Andreas Kolb from University of Erlangen-Nuremberg. He offered a number of suggestions for further improving my paper.

## 二、與會心得

The American Risk and Insurance Association Annual Meeting is the largest conference in the area of risk management and insurance in the world. Many related scholars and researchers regularly attend this conference. Many of the papers presented on this conference are good papers and very much likely to be published on good journals.

One of the major advantages of attending conferences is to understand the latest topics and ideas of



research. They may not be directly related to my current research. However, attending conferences does stimulate and inspire me for generating more research ideas and better research framework. In addition, the comments on my paper are also useful. I will take into account these comments while revising my paper.

### 三、發表論文全文或摘要

This study examines whether the stock and bond prices of firms engaging in ‘corporate social responsibility’ (CSR) can benefit from insurance-like effects during occurrences of negative events. An event study methodology is adopted, using data from the Compustat and KLD datasets covering the years from 2000 to 2008. Our results provide general support for the evidence presented in Godfrey, Merrill and Hansen (2009), that in the face of negative events, engagement in CSR provides insurance-like effects on the stock prices of firms, with the effect also being found for bond prices. We find further evidence to show that the effect exists only when firms engage in CSR on a long-term and continuous basis, and that the effect decreases with the number of negative events.

### 四、建議

N/A

## 五、攜回資料名稱及內容

Conference program and papers presented by other participants.

## 六、其他

N/A

# 國科會補助計畫衍生研發成果推廣資料表

日期:2014/01/13

國科會補助計畫	計畫名稱: 勞依茲辛迪卡評等的決定因子: 中央基金的影響
	計畫主持人: 許永明
	計畫編號: 101-2410-H-004-072- 學門領域: 財務
無研發成果推廣資料	

101 年度專題研究計畫研究成果彙整表

計畫主持人：許永明 計畫編號：101-2410-H-004-072-

計畫名稱：勞依茲辛迪卡評等的決定因子：中央基金的影響

成果項目		量化			單位	備註（質化說明：如數個計畫共同成果、成果列為該期刊之封面故事...等）	
		實際已達成數（被接受或已發表）	預期總達成數（含實際已達成數）	本計畫實際貢獻百分比			
國內	論文著作	期刊論文	0	0	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%		
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（本國籍）	碩士生	0	0	100%	人次	另有兩位大專生參與研究計畫相關事務性工作。
		博士生	1	1	100%		
博士後研究員		0	0	100%			
專任助理		0	0	100%			
國外	論文著作	期刊論文	1	1	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%	章/本	
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（外國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
博士後研究員		0	0	100%			
專任助理		0	0	100%			

<p>其他成果 (無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。)</p>	<p>無</p>
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	成果項目	量化	名稱或內容性質簡述
科 教 處 計 畫 加 填 項 目	測驗工具(含質性與量性)	0	
	課程/模組	0	
	電腦及網路系統或工具	0	
	教材	0	
	舉辦之活動/競賽	0	
	研討會/工作坊	0	
	電子報、網站	0	
	計畫成果推廣之參與(閱聽)人數	0	

# 國科會補助專題研究計畫成果報告自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

達成目標

未達成目標（請說明，以 100 字為限）

實驗失敗

因故實驗中斷

其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形：

論文： 已發表  未發表之文稿  撰寫中  無

專利： 已獲得  申請中  無

技轉： 已技轉  洽談中  無

其他：（以 100 字為限）

已投稿至 Geneva Risk and Insurance Review。

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）（以 500 字為限）

本研究的目的是在於：找出影響勞依茲保險人接受評等機率及所得到評等之決定因子。由於勞依茲保險市場之特色之一，係該市場設有所謂的中央基金，辛迪卡所發行的所有保單，皆受到該基金的全額保證。也因為此點特色，讓此研究與前人研究有所不同。我們發現：大型、獲利能力較好與流動性較高的辛迪卡，較容易被評等，也會得到比較高的評等；對再保險較為依賴的辛迪卡，也會較容易被評等，但會得到比較低的評等。我們的發現，較為支持「訊號假說」。未來相關的研究，可朝不同評等公司所給的評等，其決定因子是否會有所不等等方面思考。